1.0 PURPOSE OF AND NEED FOR ACTION

1.1 DESCRIPTION OF THE PROJECT AREA

The Gravina Access Project area is in the Ketchikan Gateway Borough (Borough) in southeast Alaska, about 680 miles north of Seattle, Washington, and 235 miles south of Juneau, Alaska (see Figure 1.1). The Borough contains two major islands, Gravina Island and Revillagigedo Island. The two islands are separated by Tongass Narrows, a 13-mile-long waterway that varies in width from ¼ to 1 mile. Most of the Borough's 14,000 residents live on Revillagigedo Island (on the eastern side of Tongass Narrows), whose major communities are Ketchikan and Saxman.

On Gravina Island (on the western side of Tongass Narrows), the land is undeveloped except for the Ketchikan International Airport (on its eastern shore) and a timber processing plant to the north of the airport. A few private homes are in the northernmost portion of the island and in the Clam Cove area on the southeastern shore. The island also includes large parcels of land owned by the Borough, the Alaska Department of Natural Resources (DNR), the Alaska Mental Health Trust Authority, and the U.S. Forest Service (USFS).

At the southern end of Tongass Narrows, between Revillagigedo Island and Gravina Island, is a smaller island, Pennock Island. Pennock Island is undeveloped, except for some privately owned parcels with single-family homes along the northern shores of the island. The portion of Tongass Narrows east of Pennock Island is called East Channel, and the portion to the west is West Channel.

The principal modes of transportation to islands within the Borough are by airplane (including floatplane) and ship. There is no "hard link" (surface) transportation between the islands. The primary public access to Gravina Island from Revillagigedo Island is an airport ferry that transports vehicles, bicyclists, and pedestrians across Tongass Narrows directly to the airport terminal.

Terrain constraints, ownership patterns, and access limitations restrict the availability of developable parcels to the waterfront areas along Tongass Narrows. As a result, opportunities for development in these areas have become a major factor in land use planning and economic forecasting.

1.2 PROPOSED ACTION

The Alaska Department of Transportation and Public Facilities (DOT&PF), in cooperation with the Federal Highway Administration (FHWA), has developed the Gravina Access Project to improve public access between Revillagigedo Island and Gravina Island. This project is one of 17 high-priority infrastructure projects in the State of Alaska to be federally funded under the Federal Transportation Equity Act for the 21st Century (TEA-21), enacted in 1998. The TEA-21 authorizes approximately $20 million for construction of a bridge joining Gravina Island to the community of Ketchikan on Revillagigedo Island[1].

[1] Public Law 105-178, Subtitle F (High-Priority Projects), Section 1602 (Project Authorizations).

1.3 PURPOSE OF AND NEED FOR THE PROPOSED ACTION

The purpose of and need for the Gravina Access Project are as follows:

> ***Purpose:*** The purpose of the Gravina Access Project is to improve surface transportation between Revillagigedo Island and Gravina Island.
>
> ***Need:*** The need for improving access is threefold:
>
> - To provide the Ketchikan Gateway Borough and its residents more reliable, efficient, convenient, and cost-effective access for vehicles, bicycles, and pedestrians to Borough lands and other developable or recreation lands on Gravina Island in support of the Borough's adopted land use plans;
> - To improve the convenience and reliability of access to Ketchikan International Airport for passengers, airport tenants, emergency personnel and equipment, and shipment of freight; and
> - To promote environmentally sound, planned long-term economic development on Gravina Island.

The following paragraphs further explain these needs.

1.3.1 Need for Access to Land

> ***To provide the Ketchikan Gateway Borough and its residents more reliable, efficient, convenient, and cost-effective access to Borough lands and other developable or recreation lands on Gravina Island in support of the Borough's adopted land use plans***

Borough Land Grant. Under Title 29 of the Alaska Statutes,[2] a general grant of land was made to the Borough to help the Borough meet "its legitimate needs for public or private settlement or development." The lack of access to Title 29 entitlement lands on Gravina Island combined with the geographic constraints of the region have limited the base of developable land to a narrow strip along Tongass Narrows on Revillagigedo Island. Within this narrow strip, the scarcity of suitable vacant land for expansion has caused several problems:

- High land costs (due to low supply and high demand)
- Loss of business opportunities
- Increased pressure to develop lands that are environmentally marginal in terms of development potential (e.g., wetlands and steep slopes), which is an unsound land management practice
- High land development costs (because developing the environmentally marginal lands is extremely costly)
- Development patterns that result in inappropriate or incompatible land use for some geographic locations (e.g., waterfront development that excludes water access dependent industries)

[2] Title 29 (Municipal Government), Chapter 65 (General Grant Land), Alaska Statutes.

These are the very problems the Alaska State Legislature was trying to avoid when it enacted Title 29, and show that the purposes of the general grant of land have not been fulfilled. The land grant in itself is not enough because, without reasonable access to the land, the State cannot fulfill the purposes for which Title 29 was enacted—namely, to meet the legitimate needs of the Borough for settlement and development and to attain sound land management through rational ownership patterns[3].

Other Landowners. The undeveloped properties of several other Gravina Island landholders, including the Alaska Mental Health Trust Authority, USFS, DOT&PF, DNR, and Native corporations, could also be used to meet the needs of the property owners and the community for settlement and development. Road access to these properties would enhance the opportunity for the landowners to sell or lease them.

Accessibility Issues. Vehicles can currently access the Ketchikan International Airport via the existing airport ferry; however, no public road access is available to any other public or private property on Gravina Island. A private access road runs north from the airport to a timber processing plant near Lewis Reef. The Borough has acquired a provisional permit from the U.S. Army Corps of Engineers for construction of a new road around the west side of the airport to the Lewis Reef development area. At this time, funding has not been secured for construction of the road. Except for cars driven by employees of the timber processing plant on the existing private road, all vehicles ferried to the airport remain on airport property while on Gravina Island. Without road access to its entitlement lands on Gravina Island, the Borough's ability to make this land available to its residents is severely constrained.

Suitable Use of Developable Lands. Without access to expansion areas, development will continue to crowd the waterfronts of Revillagigedo and Gravina Islands simply because the waterfronts are accessible. Improved access to non-waterfront property on Gravina Island would provide greater opportunities for non-water-dependent development to locate inland, at more economical sites, thereby freeing up waterfront land for water-related and water-dependent uses.

1.3.2 Need for Improved Access to Airport

> ***To improve the convenience and reliability of access to Ketchikan International Airport for passengers, airport tenants, emergency personnel and equipment, and shipment of freight***

Ketchikan International Airport is owned by the DOT&PF, but is operated and maintained by the Borough under a long-term lease. The airport is the primary transportation link into and out of the Borough, accommodating the air traffic of commercial air carriers, commuter carriers, air taxi and flightseeing (i.e., sightseeing by aircraft) operators, general aviation, cargo carriers, and the U.S. Coast Guard (USCG). Ketchikan, the largest city in the Borough, is the primary air and marine hub in the southern portion of southeast Alaska. As such, the airport serves as the air-connecting point for all of the Borough's approximately 14,000 residents and for the 8,500 residents in neighboring communities, such as Metlakatla, Klawock, Craig, and other Prince of Wales Island communities.

[3] Title 29 (Municipal Government), Chapter 65 (General Grant Land), Alaska Statutes; and Chapter 180, SLA, 1978.

The airport ferry provides the only access to the airport for passengers on foot and in vehicles. Passengers may also arrive at the airport by floatplane at the floatplane terminal, which is just north of the ferry terminal on Gravina Island.

The terminal for the airport ferry on Revillagigedo Island is about 2.8 miles northwest of downtown Ketchikan. Most of the year, the ferry leaves the terminal every half-hour, but during the summer (May/June through August/September, depending on need), a second ferry operates to handle the higher demand and service increases to every 15 minutes. The airport ferry schedule is limited, essentially serving the airport during the airport's hours of operation (opening at 6:00 a.m. and closing at 8:00 p.m. during the winter season and at 10:00 p.m. during the summer season).

1.3.2.1 Improved Convenience and Reliability of Access for Passengers

Restricting air passengers to travel by ferry between the airport and community is inconvenient in many respects:

- Negotiating the ramps and the distance between the airport terminal and ferry is difficult for the elderly and disabled.
- The average total travel time to the airport from the ferry terminal on Revillagigedo Island is 19 minutes, which includes waiting for, loading, and unloading the ferry.
- Embarking and disembarking from the ferry and the crossing travel time adds as much as 30 minutes to each end of a trip to/from Ketchikan.
- Mechanical problems with the ferry or shoreside facilities (occurring about once per year) can add further delays to travel and result in missed plane flights.
- During peak season, when full planeloads of passengers are deplaning, the ferry fills up. Many passengers must then wait for the next ferry, adding even more time to their trip.
- The airport ferry limits the potential transport of planeloads of passengers from chartered aircraft to and from cruise ships whose itineraries might begin or end in Ketchikan.
- Travel to the airport is tied completely to the ferry schedule; missing a ferry can mean missing a plane flight. Coordinating an air travel schedule with the ferry schedule adds inconvenience and stress to travel.
- Plane flights missed in Ketchikan because of the ferry travel time and unanticipated delays often have a domino effect of missed connections or appointments at the other end of the trip, which frustrates passengers and raises costs to airlines, businesses, and the public.
- The average waiting time for ferry passengers during the winter months (i.e., when the ferry departs from both terminals every 30 minutes) is 9 minutes for foot passengers and 12 minutes for vehicle passengers.

All of these factors contribute to a decrease in the quality of travel into and out of Ketchikan.

1.3.2.2 Improved Convenience and Reliability of Access for Airport Tenants

In many cities, airports become generators of economic development in their own right. Air carriers, rental car operators, and other support services such as airplane repair, charter operators, hotels, restaurants, couriers, and light manufacturers often want to locate their

business next to an airport. However, operating these services at Ketchikan International Airport costs more because of the inconvenience, additional handling of materials, and extra time to work around the limitations of the ferry schedules. These costs and difficulties reduce the economic potential of the Ketchikan International Airport. There is a considerable disincentive to locating a business at the airport in terms of cost and inconvenience to both employees and customers. Because of the direct cost of access (the ferry fare is $6 per car and $4 per person) and the more difficult scheduling (to coordinate the timing of the trip with the ferry schedule), only essential services are located on airport property. This, in turn, reduces airport lease revenues, and makes the airport more expensive for the Borough to operate.

In addition to enhancing overall economic development of the Borough, improved access is needed to help airport tenants conduct their business competitively and efficiently:

- Employers at the airport often need to move parts, supplies, and personnel between town and the airport. The ferry trip adds up to an hour in lost productivity.
- The ferry service schedule prohibits after-hours access to the airport, which limits employers' ability to perform aircraft and building maintenance during off-peak hours.
- Deliveries of goods and services to the airport may be delayed as a result of ferry schedule or capacity, extreme tides that affect the ability of large vehicles to load onto and unload from the ferry, and mechanical problems. These delays lessen the ability of the airport tenants to promptly and efficiently provide services to their customers.
- The ferry imposes limitations on the services that airport tenants can provide because of its schedule, capacity, and restrictions on the type and weight of materials that can be transported.

1.3.2.3 Improved Convenience and Reliability of Access for Emergency Personnel and Equipment

Every year, Ketchikan's fire department and hospital personnel coordinate more than 160 medical evacuations (medevacs) using Ketchikan International Airport. The city's fire department is also responsible for responding to fires on Gravina Island that are not within the jurisdiction of the airport's Aircraft Rescue and Fire Fighting (ARFF) department. [Although ARFF can respond to fires on Gravina Island that are not related to the airport, such duties are beyond the ARFF's designated use.] Transporting emergency personnel and equipment between the airport and Ketchikan is inconvenient and limits the ability of emergency personnel to respond to emergencies quickly and efficiently. Emergency medical services staff must coordinate their activities with the airport administrator to ensure timely transport of personnel and equipment; specifically:

- In a typical medevac situation during off hours (when the ferry is not operating), the fire department first informs the airport administrator by telephone of the medevac operation. Then the airport administrator alerts the ferry crew; the ferry crew then goes to the ferry, starts the engine, and waits some time for the engine to warm up. Finally the ferry transports the emergency personnel and equipment to the airport.
- During the day when the ferry is operating, emergencies also require coordinating with the airport administrator, and the ferry schedule is interrupted to respond immediately.

- Emergency equipment (ambulances and fire trucks) are physically prevented from boarding the ferry during extreme low tides or extreme high tides by the steep incline and angle between the ferry and the ramp.

1.3.2.4 Improved Convenience and Reliability of Access for Shipment of Freight

Numerous companies on Revillagigedo Island rely on the airport ferry to ship cargo, fuel, and other products to and/or from the airport. The restrictions of the ferry schedule and its capacity, unexpected mechanical difficulties, and extreme tides can limit the abilities of shipping services to move freight expediently. The main problems of using the ferry to transport freight to and/or from the airport are as follows:

- Couriers and others picking up packages must work around the ferry schedule, which can increase their delivery times. This system is not only inefficient and inconvenient, but it also adds to the cost of doing business in Ketchikan.
- Delays caused by the ferry system (e.g., by capacity issues, schedule and travel time, and mechanical difficulties) can be detrimental to the shipment of seafood products (especially fresh) by air. To a large extent, seafood processors take the ferry schedule into consideration when scheduling their packaging activities to ensure that the freshest possible product is delivered to the customers. If ferry delays cause a flight to be missed, the seafood products must be held in cold storage at the airport while waiting for the next available flight.
- The travel and waiting time associated with the ferry crossing reduces the amount of time a truck and driver can be actively making deliveries. A driver and truck can be tied up for an hour or more while waiting for the ferry, which adds to the cost of shipping.
- There is a limit on the amount of fuel that can be transported by ferry. Fuel shippers transporting fuel to the airport must use small tanker trucks (or only partially fill larger trucks) and make deliveries more often, which is inefficient and costly.
- Because the ferry operates only during the daytime, shipping services cannot transport freight late at night or in the early morning, when traffic congestion would be at a minimum and they could operate more efficiently.

1.3.3 Need for Economic Development

To promote environmentally sound, planned long-term economic development on Gravina Island

Historically, the economy of the Borough has been driven by natural resources, and has thus suffered over the years from instability and economic downturns. Ketchikan began as a mining town in the late 1800s. When mineral prices declined, fishing and timber harvest became the dominant economic forces.

Alaska's forest products industry began in 1951, with a 50-year timber sale contract between the Ketchikan Pulp Company (KPC) and USFS. KPC built a $52,500,000 pulp mill, operated sawmills in Ketchikan and Metlakatla, and became the community's largest employer. However, in the late 1980s, timber harvests began to decline significantly. Between 1988 and 1998, the total value of the industry's international exports from Alaska declined by 56 percent (from $475,000,000 to $208,000,000). These declines in the timber industry have caused a

correspondingly sharp decline in the industry's employment in southeast Alaska. Consequently, it has become important that the Ketchikan area create specialized forest products that appeal to many markets.[4]

Economic Planning. Attempting to deal with the economic downturn, the Borough has aggressively planned for economic development as a way to stabilize its local economy. According to its 1996 Comprehensive Plan,[5] the goal for economic development is to "expand and diversify the local economy" and the primary mechanism for achieving this goal is "Gravina Island development." The plan also states that, because of the scarcity and high costs of developable land, it is "essential for the benefit of the entire community that the land use be carefully planned." The 1998 Overall Economic Development Program[6] identifies bridge access to Gravina Island as a priority for increased opportunities for development of additional ports, harbors, and industrial, commercial, and residential properties.

Role of Transportation. A key component of the project's purpose is to provide a transportation system that benefits the local economy. The lack of access to developable land on Gravina Island is a problem that limits development of the economy in the Borough. Businesses that currently operate from Gravina Island or otherwise rely on transportation to Gravina Island are limited by the inconvenience of the current access options (i.e., airport ferry, plane, floatplane, boat, or barge). Transporting employees and products on the airport ferry is costly and inefficient, and limits productivity. Improved access would give businesses opportunities to raise productivity levels and expand operations, which would enhance the local economy.

Recreational Use. Tourism would continue to be a major component of the economy for the Borough. Improving the transportation link between Ketchikan International Airport and Revillagigedo Island would create opportunities for independent travelers and for cruise and tour ships to use Ketchikan as a point of departure. Access to federal and state-owned lands on Gravina Island for recreational use and tourism would encourage the development of visitor facilities, which would broaden these sectors of the economy.

1.4 HISTORY AND BACKGROUND: PLANNING STUDIES

For many years, the Borough, which is the planning authority for the project area, has conducted several studies that characterize the availability and accessibility of developable land. A statement in the foreword to its Tongass Narrows Crossing Study[7] report (issued more than 20 years ago) asserts:

> "Hard access to Gravina Island has been the desire of the Ketchikan community for a number of years."

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[4] DOT&PF, *Gravina Access Project, Demographic and Socioeconomic Analysis*, April 2000.

[5] Ketchikan Gateway Borough Planning Department, *Comprehensive Plan*, 1996.

[6] Ketchikan Gateway Borough Planning Department, *Ketchikan Gateway Borough Overall Economic Development Program: Major Program Revision 1998*, September 1998.

[7] Ketchikan Gateway Borough Planning Department, Tongass Narrows Crossing Study reports, prepared by EMPS-Sverdrup: *Phase I–Site Selection Study,* November 1981; *Phase II—Alternative Corridor Investigation*, December 1981; *Alternative Corridors* and *Summary of Findings,* May 1982.

And the study's statement of purpose contends that:

> "Intermittent access, such as provided by the existing shuttle ferry, is not considered adequate to spur development upon Gravina Island, nor does it provide convenient accessibility for traffic to and from the airport and other points on the island."

Previous studies of crossing locations, costs, and local impacts[8] were cited in the Tongass Narrows Crossing Study report, some of which also explored the possibility of including access to Pennock Island as part of the crossing.

Problems with land use and accessibility, as supported in the Borough's studies and plans, are summarized as follows:

- Lack of access to Borough lands on Gravina Island has made it difficult for the Borough to provide the land needed to meet the needs of its citizens for reasonable growth and development.
- The scarcity and high cost of land on Revillagigedo Island severely limit opportunities for growth, development, and diversity of industrial, commercial, residential, and recreational pursuits.
- Access to the airport is inconvenient and inefficient for airport users and businesses. The airport ferry operates 16 hours per day with departures every 15 to 30 minutes, depending on the season, which requires travelers to consider the ferry schedule when making plans to meet a flight at the airport.

The history of land development and land planning in the Borough provides a background on the need for improving access to Gravina Island. Table 1-1 provides a list of Borough-sanctioned or adopted studies and plans that discuss land availability and provide the Borough's direction for addressing land availability issues. These documents assume and consistently express the Borough's explicit, long-standing intentions to promote and facilitate land settlement and development. The principal motivation of the Borough is to improve the economic health of the region by establishing residential, commercial, and industrial uses of its developable lands.

[8] City of Ketchikan, *Ketchikan Comprehensive Plan Policies*, September 1976; Ketchikan Gateway Borough, *Waterfront Development/Management Study, Phase One*, prepared by Charles Pool & Associates, December 1980; and Reid, Middleton and Associates, *Ketchikan International Airport Master Plan*, March 1981.

TABLE 1-1
PLANNING STUDIES ADDRESSING ACCESS TO GRAVINA ISLAND

STUDY	YEAR	PREPARED FOR
Waterfront Development Management Study	1982	Ketchikan Gateway Borough Planning Department
Land Use Inventory and Projections	1984	Ketchikan Gateway Borough Planning Department
Pennock and Gravina Island Neighborhood Plan	1985	Ketchikan Gateway Borough Planning Department
Ketchikan Gateway Borough Comprehensive Plan: Community Goals to 1990	1986	Ketchikan Gateway Borough Planning Department
Coastal Management Program	1984; Revised 1989	Ketchikan Gateway Borough Planning Department
Land Use Inventory	1991	Ketchikan Gateway Borough Planning Department
Ketchikan International Airport Industrial Development Plan	1993	Ketchikan Gateway Borough Planning Department
Overall Economic Development Plan	1994	Ketchikan Gateway Borough Planning Department
Land Use Surveys	1995 and 1996	Ketchikan Gateway Borough Planning Department
Ketchikan Gateway Borough Comprehensive Plan	1996	Ketchikan Gateway Borough Planning Department
Lewis Reef Development: Purpose, Needs, and Alternatives	1997	Ketchikan Gateway Borough Planning Department
Overall Economic Development Plan	1998	Ketchikan Gateway Borough Planning Department
Gravina Island Plan	In Progress 2002	Ketchikan Gateway Borough Planning Department

The descriptions provided in the following sections summarize the purpose, findings, and conclusions of these studies as they relate to the Gravina Access Project. Each of the listed documents was issued by the Borough. For more detailed information, refer to the original documents, which are available from the Borough for public reference.

1.4.1 Waterfront Development Management Study (1982)

This study analyzed existing waterfront uses within the Borough and predicted a need for road-accessible commercial and industrial waterfront land by the year 2000. The study's inventory of waterfront land uses showed that the available sites within the City of Ketchikan could meet the land needs of small commercial or industrial activities, but not those of larger enterprises. The study concluded that the Gravina Island airport area has the best short-term development potential because of its existing transportation links and utilities infrastructure. The eastern shoreline of Gravina Island was identified as one of the two best areas for long-term development, based on topography, existing land uses, and land availability.

1.4.2 Land Use Inventory and Projections (1984)

The Borough inventoried all private property and Borough land on the road system from Settlers Cove to Herring Cove (Revillagigedo Island) and projected land use needs to the year 2000. This inventory and projection became the baseline information for the 1986 update of the Borough's *Comprehensive Plan* (see Section 1.4.4).

1.4.3 Pennock and Gravina Island Neighborhood Plan (1985)

The *Pennock and Gravina Island Neighborhood Plan*, prepared in 1985, sets up a framework for the development of the lands on Gravina and Pennock Islands. One objective of the plan was to develop a transportation system that would provide access to interior land without compromising the qualities that attracted residents to the area. The plan clearly articulates a vision for future transportation access that would include a ferry. Regarding a bridge, the plan states: "Hard access by bridge or tunnel from Pennock to Gravina Island is not envisioned in the foreseeable future and, in light of the rural characteristics, should not be pursued. Hard access and its possible location is of concern to the community as a whole and should be determined by a borough-wide vote." The *Pennock and Gravina Island Neighborhood Plan* was written at a time when considerable economic and population growth was anticipated in Ketchikan as a result of mineral development. That mineral development did not occur and the growth of Ketchikan was not consistent with the assumptions of the plan.

1.4.4 Ketchikan Gateway Borough Comprehensive Plan: Community Goals to 1990 (1986)

In 1986, the Borough updated its *Comprehensive Plan*. The plan estimated that residential single-family development was at one-third capacity, and that it could double before new growth areas would be needed; the remaining one-third of capacity would provide adequate choice, supply, and flexibility in the housing market. The plan calculated that new growth areas would be needed in 2008, and that new areas for residential single-family development would be needed in 1995 if there were no further development of the Borough.

For commercial land, demand was projected to exceed supply in 1996, and for industrial land, in 2005. Despite estimating enough supply to generally meet demand in the short term, the plan indicated that the "Borough's roaded system may not be able to supply large industrial tracts or tracts with suitable waterfront," and that these land use needs "could require the opening up of new growth areas prior to residential expansion needs."

The plan set two specific goals for Gravina Island access:

> "We shall provide for a broad and secure economic base and orderly growth while preserving the health, safety, beauty, and essential character of the community." A policy that would help implement this goal states "Specific public projects with significant community wide economic benefits include: …improved access to the airport" [among others].
>
> "Air, water, and surface transportation systems within the borough that facilitate the development goals of the community will be provided." Objective 4 under this goal states "Improve access to Gravina and Pennock Islands."

1.4.5 Coastal Management Program (1984; Revised, 1989)

This plan inventoried commercial and industrial waterfront, and found that the downtown area was one of the few areas in Ketchikan where waterfront use was balanced between water-dependent, water-related, and non-water-dependent uses. The plan attributed this balance to the adjoining tracts of level land that allow efficient use. At the other end of the spectrum was the "west end" commercial area, where only 3 percent of the waterfront use was water-related. The plan concluded that the west end's commercial center is an example of how the scarcity of large, level lots for commercial development impinged upon another scarce resource—prime waterfront property within city limits.

The inventory showed 32 miles of shoreline accessible from the road system, with about two miles of remaining shoreline considered to be available, suitable, and accessible for water-related commercial and industrial uses. To accommodate the need for more commercial and industrial waterfront property, the plan discussed a proposed hard link to Gravina Island. The plan noted that a bridge or a tunnel has been seriously considered for decades, and that the purposes of a hard link included airport development, access to commercial and industrial waterfront property, access to Borough land, and mutual aid for fire and police services.

1.4.6 Land Use Inventory (1991)

In 1991, the Borough Department of Planning and Community Development inventoried developed and vacant land in the urbanized portion of the Borough and reported that approximately 85 percent of the vacant (i.e., undeveloped) land was zoned for residential use. Half of the remaining acreage was designated for industrial use, one-quarter for commercial use, and one-quarter for public use. Of the 901 acres zoned for industrial use, only 256 acres were vacant in and around Ketchikan. The inventory reported that most of the vacant industrial land (157 acres) was held by DNR and Louisiana Pacific Corporation (i.e., Ketchikan Pulp Company).

1.4.7 Ketchikan International Airport Industrial Development Plan (1993)

In this report, the Borough estimated how long the remaining supply of industrial land would last, based upon the 1991 inventory. From 1980 to 1990, an average of 18 acres of commercial/industrial land had been used each year. Based on the absorption rates and the 1991 supply (i.e., 256 acres), the report estimated 10 to 20 years of supply, but, depending on rate of consumption, estimated that it could be as little as five years or as many as 30 years of

supply. The report did not take into account the developability of the remaining 256 acres of land zoned for industrial use.

According to the analysis, there may "eventually be a shortage of developable land in Ketchikan," and Ketchikan is surrounded by vacant land that is "severely limited by land ownership and mandated uses;" without changes to ownership of state and federal lands, the land "shortage is at least true in the short run." The market analysis concluded that the amount of land available for uses that would most likely locate at or near an airport was limited, and that land for future economic development was limited unless more land could be added to the inventory of developable or developed land.

The plan considered six sites for industrial development on Revillagigedo Island plus Pennock Island, but found none of them suitable. The study recommended that the Borough pursue strategies for developing industrial land adjacent to the airport on Gravina Island. According to the study, the one negative aspect of airport industrial development was that "access to the Ketchikan airport is problematic, requiring improvements in the auto and passenger ferry service and capacity or significant capital costs of bridges."

1.4.8 Overall Economic Development Plan (1994)

This *Overall Economic Development Plan* (OEDP) identified economic issues and developed strategies for addressing them. One of the main issues was "a shortage of industrial sites with infrastructure, roaded access, appropriate locations, and adequate size."

Although other areas were investigated as potential industrial sites, an industrial sites task force proposed that the Borough identify sites along the Tongass waterfront that would be suitable for wood products manufacturing and seafood processing, from the northern end of the airport to the northern end of Gravina Island, and assist potential developers in applying for the necessary permits. The task force reported that there were only seven undeveloped industrial sites (totaling 19 acres) in Ketchikan that had water, sewer, and power. The Borough issued a major revision of this plan in 1998 (see Section 1.4.12).

1.4.9 Land Use Surveys (1995 and 1996)

A Fall 1995 survey of the roaded system from Settler's Cove on the North Tongass Highway to Herring Cove on the South Tongass Highway found approximately 1,250 vacant parcels of land. The Borough's *Comprehensive Plan* indicated that "topographical constraints might physically rule out development on many of these sites, or make them prohibitively expensive to develop." There appeared to be "sufficient land base to satisfy the community's short-term future needs for residentially zoned property." Commercial and industrial properties, particularly those with waterfront access, however, were "perceived to be in short supply."[9]

In the winter of 1996, the Borough surveyed the Tongass Highway corridor from Beaver Falls to Settlers Cove to determine actual land use. With few exceptions, commercial and industrial development occurred adjacent to the highway corridor, interspersed with residential development either immediately adjacent to it or directly opposite across the highway. The

[9] Ketchikan Gateway Borough Planning Department, *Comprehensive Plan*, 1996.

analysis concluded that, "In part, because of the scarcity of developable land for commercial and industrial purposes, adjacent conflicting land uses are prevalent in the Borough."[10]

1.4.10 Ketchikan Gateway Borough Comprehensive Plan (1996)

According to the plan's Land Use Element, industrial needs were projected to use at least half of the available 1991 supply of vacant industrial land and at least 80 percent of the commercial land would be consumed over the next ten years (presumably by 2006). The plan indicated that:

> While the supply of vacant industrial and commercial lands can meet projected acreage needs, the supply is not sufficient for effective market competition. Type, location, and size of vacant land frequently lower their desirability. To optimize competition, it is generally recommended that a supply three times the amount of land needed should be available. Using this formula means demand would exceed supply of vacant commercial land [and] demand would equal 90 percent of the supply of vacant industrial land in the next ten years.

A Commercial and Industrial Land Committee was formed as part of the "Ketchikan 2004" process. The committee preferred the development of Lewis Reef on Gravina Island, but concluded that development there might require hard-link access to the airport. The Comprehensive Plan's Transportation Element indicated that "a bridge spanning Tongass Narrows has been a planning topic ever since the airport was opened," but that high construction costs have deterred planning from going forward.

The plan further indicated that the Borough could take advantage of the airport's waterfront location by using it for an aviation-related industrial park. The plan recommended zoning the area against competing uses; this has occurred to some extent, with industrial zoning being applied to portions of the Airport Reserve zone and private property north of the airport. The analysis indicated that, because of similar land use and the noise constraints to residential development, the areas around the airport are most suitable for industrial development. The plan continues, stating, "Industrially zoned land is in short supply, especially with saltwater access. Land on Gravina Island, both within the Airport Reserve (leased from the state), and elsewhere, is available for development but lacks access except by marine craft." The section concludes by stating that expanding the community's land base to any extent depends on providing roaded access to it—in this case, a hard link.

In the *Comprehensive Plan*, the Borough supports access to additional developable lands on Gravina Island as an economic development strategy; the goal for economic development is to "expand and diversify the local economy" and the primary mechanism for achieving this goal is "Gravina Island development." The plan's development strategies for Gravina Island included identification of ownership of lands on Gravina for transportation needs (building roads north and south of the airport), water-related uses on the waterfront, airport-related industrial uses, maintaining recreation and subsistence uses, Lewis Reef development, land for airport expansion, seafood industry facilities, residential development and large residential lots, public beaches, common waterfronts, greenbelts, moorage for small boats and small planes, and supporting commerce and industry with utilities infrastructure (power, roads, sewer, and water).

[10] Ibid.

1.4.11 Lewis Reef Development: Purpose, Needs, and Alternatives (1997)

Based on its past planning studies and to implement its comprehensive plan goals, the Borough pursued a marine industrial park for marine-related commerce and industry operations north of the airport at Lewis Reef. The purpose was to "meet the fundamental need in the area of supporting industrial development that requires immediate access to both marine and air transportation support. It will also meet a need for additional areas to locate industrial facilities to resolve land use conflicts." Of the seven sites explored, only a site on Gravina Island (at Lewis Reef) was deemed to have the characteristics needed to support the industrial park; no suitable land on Revillagigedo Island was identified.

Development of a timber processing facility has since occurred near Lewis Reef. The development is accessible by a private road that runs north from the airport. The Borough has acquired a provisional permit from the U.S. Army Corps of Engineers for construction of a new road around the west side of the airport to the Lewis Reef development area. At this time, funding has not been secured for construction of the road.

1.4.12 Overall Economic Development Plan (1998)

In 1998, the Borough updated its 1994 *Overall Economic Development Program*. Among the top three OEDP priorities is bridge access to Gravina Island. The OEDP states:

> The Ralph M. Bartholomew Veterans Memorial Bridge addresses the need for roaded transport of goods and services between Revillagigedo Island and Gravina Island. This bridge will provide access to the Ketchikan International Airport and support regional air cargo growth for the region's emerging industries. This bridge is expected to significantly increase opportunities for development of additional ports, harbors, and industrial/commercial, and residential properties. Ketchikan has identified this project as a priority in its OEDP efforts since 1976.

1.4.13 Gravina Island Plan (in Preparation, 2002)

The Borough is preparing the Gravina Island Plan to map out development goals, policies, and strategies for Gravina Island. The plan is intended to ensure orderly change through devising separate but integrated plans for five geographic areas. Each area plan would identify road and trail corridors, streamline improvements by resolving conflicts, organize economic development initiatives, provide direction for land management, and protect the values important to citizens.

The plan will become an amendment to the Borough's 1996 Comprehensive Plan, and is intended to be used as a framework for making local planning decisions and enacting a new zoning ordinance. As outlined in the Borough's *Gravina Island Plan Citizen's Guide to Public and Private Decision-making* (April 2002), the key issues facing planners are improving access from Ketchikan, building a new road system, promoting commerce and industry, accommodating tourism and recreational users, developing residential areas, providing services and infrastructure, supporting commercial resource harvesting, and sustaining subsistence uses.

Central to the Borough's planning perspective is that the relatively untouched landscape of Gravina Island demands and deserves careful management, and that protecting the natural

setting that attracts tourists is the best long-term economic strategy. Four major types of development are already slated for the near term: timber harvesting, airport expansion, road construction, and industrial construction.

1.5 HISTORY AND BACKGROUND: ENGINEERING STUDIES

Since the early 1970s, numerous engineering studies have addressed various alternatives for providing access via a hard link (bridge or tunnel) across Tongass Narrows (see Table 1-2). These studies demonstrate a long-term commitment by the community and governmental entities to improve access to Gravina Island, beginning in 1973 with the opening of the Ketchikan International Airport and the start of the airport ferry shuttle service across Tongass Narrows. The State of Alaska responded that year by examining five proposed bridge crossings. Since then, several other engineering studies of bridges and tunnels have been conducted.

TABLE 1-2
ENGINEERING STUDIES ADDRESSING ACCESS TO GRAVINA ISLAND

STUDY	YEAR	PREPARED FOR
Gravina Island Crossing Reconnaissance Report	1973	Alaska Department of Highways Southeastern District Reconnaissance Section
Tongass Narrows Crossing Study	1981-1982	Ketchikan Gateway Borough Planning Department
Tongass Narrows Crossing Benefit/Cost Study	1985	Ketchikan Gateway Borough Planning Department
Gravina Road Corridor/Airport—Hard Link	1989	Ketchikan Gateway Borough Planning Department
Tongass Narrows Crossing Preliminary Scoping Study	1992	James M. Montgomery Consulting Engineers
Environmental Impact Statement	1994	DOT&PF

In 1981, the Borough examined eight bridges and three underwater tube crossings. In 1985, Tippetts-Abbett-McCarthy-Stratton (TAMS) analyzed the costs of proposed bridge, tube, and ferry crossings on behalf of the Borough.

In 1988, the Borough passed Resolution 794 supporting a hard-link crossing and the preparation of an Environmental Impact Statement (EIS). In 1989, the Borough studied road routes on Pennock and Gravina Islands to the airport.

In 1991, the Alaska Legislature authorized funding for the Ketchikan hard-link EIS. In 1994, the DOT&PF prepared a draft EIS of three crossing options, as discussed in Section 1.5.4. Most recently, in 1998, $20,443,000 was allocated specifically for this project under TEA-21. Additional funding will be required to begin construction of a selected access alternative.

The reports of these studies are briefly described in this section (Section 1.5). The reports are available to the public for reference at the Ketchikan Project Office at 430 Dock Street.

1.5.1 Gravina Island Crossing Reconnaissance Report, 1973

The *Gravina Island Crossing Reconnaissance Report* study (Alaska Department of Highways; April 1973)[11], which was completed during the construction of the Ketchikan International Airport, evaluated five potential bridge routes across the Tongass Narrows:

A—From Mile 4.6 on North Tongass Highway (just south of Peninsula Point) to Lewis Point

B—From Mile 4 on North Tongass Highway to the northern end of the airfield

C—From Charcoal Point to the southern end of the airfield

D-North—From Mile 1.1 on South Tongass Highway (just south of the USCG Station) to just south of Clam Cove, via Pennock Island

D-South—From Mile 3 on South Tongass Highway (just south of Saxman) to just south of Clam Cove

All five alternatives were proposed with horizontal navigational clearances of 500 feet and vertical clearances of 130 feet, and two alternatives included less costly variations with vertical clearances of 50 or 75 feet. These lower clearances would prevent passage of larger vessels, such as state ferries, cruise ships, and oil tankers. Alternative C included a moveable (vertical lift) bridge as one variation.

The report recommended deferring bridge site selection and design until the effects of the new airport operations on development and traffic trends were more fully established.

1.5.2 Tongass Narrows Crossing Study, 1981-1982

In 1981 and 1982, the Borough undertook an extensive Tongass Narrows Crossing Study[12] regarding a hard-link route from Ketchikan to Gravina Island. The study as originally conceived had three phases: I—Site Selection; II—Investigation of Alternatives; and III— Feasibility (tube versus bridge).

1.5.2.1 Phase I—Site Selection

The study established institutional and physical crossing constraints, investigated 11 crossing corridors (eight bridges and three tunnels), and recommended corridors for further investigation in later phases of the study. Each of the eight bridge alternatives, two of which crossed Pennock Island, were proposed with horizontal navigational clearances of 500 feet and vertical clearances of 145 feet. For the Pennock Island alternatives, the West Channel bridges were proposed with horizontal and vertical navigational clearances of 500 feet and 145 feet, respectively, whereas the East Channel bridges were proposed with horizontal navigational clearances of 300 feet and vertical navigational clearances of 55 feet. For corridor assessment, investigators used a full range of evaluation factors: traffic congestion, travel distance, marine

[11] Alaska Department of Highways Southeastern District Reconnaissance Section, *Gravina Island Crossing Reconnaissance Report*, Project S-0922(1), April 1973.

[12] Ketchikan Gateway Borough Planning Department, *Tongass Narrows,* November 1981; *Phase II—Alternative Corridor Investigation*, December 1981; *Alternative Corridors* and *Summary of Findings,* May 1982.

navigation, airport activity, environmental effects, community development, right-of-way displacement, costs, geologic and soils concerns, air navigation risks, and geometric design.

The resulting assessment narrowed the focus of the next study phase to three bridge corridors and one tunnel corridor. These four corridors were judged the most favorable crossing locations because of their convenient connections; minimal impacts on development, environmental resources, and traffic modes; excellent foundation potentials; and shorter crossing lengths.

1.5.2.2 Phase II— Investigation of Alternatives

This report identifies the general considerations and constraints applicable to the four crossing corridors recommended in Phase I, as well as one new corridor, added by the Borough after its review of the report. The new crossing corridor was a tube tunnel from the intersection of Tongass Highway and Shoreline Drive to either the Lewis Reef area or near the medium-intensity approach lighting system of the airport runway.

The Phase II investigation reflected the constraints developed in Phase I, as well as information gathered from the public and government agencies, bathymetric data, and more detailed engineering analysis. For one of the bridge corridors (Corridor 7), the additional possibility was raised of constructing a causeway instead of a bridge, which would require thorough investigation of the effects on tidal movements. The report recommended two corridors for further feasibility evaluation in Phase III: Corridors 3 (bridge) and 11 (tube tunnel).

1.5.2.3 Phase III – Additional Studies

In the original project scope, Phase III was to be a feasibility study that would compare the most favorable bridge and tunnel options and recommend a preferred crossing type. However, in light of comments received at a public hearing in February 1982, the Phase III scope was redirected to address the specific concerns of the public, and consequently, was enlarged to further investigate five corridors instead of just the two corridors designated as most favorable in Phase II. The Phase III additional studies developed additional background information and details for both bridge and tube crossings, and provided additional studies of crossing alternatives for Corridors 3 and 7 (including a partial causeway). The Corridor 2 bridge crossing and the Corridor 12 tube crossings were included in the detailed studies.

The report concluded that a bridge crossing was the most feasible hard link across Tongass Narrows, and the most favorable crossing locations were Corridor 7 (south of the airport) and Corridor 2 (north of the airport). The final recommendation was for further studies of Corridors 2, 7, and 11 to obtain additional field data, prepare an environmental assessment, develop more technical information as a basis for preliminary design plans, and, ultimately, determine the most favorable crossing corridor.

1.5.3 Other Tongass Narrows Crossing Studies, 1985-1992

Tongass Narrows Crossing Benefit/Cost Study. This 1985 study for the Borough[13] emphasized the importance of access to Gravina Island with this statement: "One central fact underscored all of the discussions and meetings held to examine this topic: the citizens and leaders of Ketchikan unanimously support improved access between the islands and view it as essential to the growth of the community."

Nine access alternatives were compared, based on quantifiable benefits and costs. The hard-link alternatives assessed were the three corridors favored by the Tongass Narrows Crossing Study conducted in 1981 and 1982: Corridor 2 (bridge), Corridor 7 (bridges via Pennock Island), and Corridor 11 (tube tunnel). In addition, the study assessed a low-level bridge or causeway to Pennock Island, three ferry systems to access Gravina Island (existing service, remodeled ferries, and larger vehicular ferries), and two ferry systems to access Pennock Island (passenger and vehicular ferries).

Gravina Road Corridor/Airport—Hard Link. This 1989 study[14] defined an alignment for a two-lane access road to the Ketchikan International Airport, with 0.6 mile of roadway on Pennock Island and 3.4 miles on Gravina Island. The study considered topography, soils, property ownership, future development, and drainage. The roadway system was designed to serve the West Channel bridge crossing that was part of Corridor 7 recommended in the Tongass Narrows Crossing Study in 1982.

Tongass Narrows Crossing Preliminary Scoping Study. This scoping study[15] summarized previous crossing reports and briefly compared three crossing corridors from the Tongass Narrows Crossing Study in 1982 (i.e., Corridors 2, 7, and 11) and one new crossing, referred to as "PN&D 72/92" after the study preparers: Peratrovich, Nottingham & Drage, Inc. The scoping study included the following new cost estimates:

Corridor 2 (bridge): $100,000,000

Corridor 7/7A (two bridges or a bridge/causeway): $100,000,000

Corridor 11 (tube tunnel): $180,000,000

PN&D 72/92 (bridge): approximately $60,000,000

These cost estimates were based on a vertical navigational clearance of 160 feet for the bridges, and also introduced a new and costly element to project requirements—protection of bridge piers from ship collisions. The report also noted that, from 1962 to 1990, bridge costs in Alaska had escalated an average of 3.5 percent per year.

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[13] Ketchikan Gateway Borough Planning Department *Tongass Narrows Crossing Benefit/Cost Study,* prepared by TAMS Engineers (Tippetts-Abbett-McCarthy-Stratton, a Professional Corporation), (apparently published in 1985).

[14] Ketchikan Gateway Borough Planning Department, *Gravina Road Corridor/Airport—Hard Link*, prepared by PEI Consultants, 1989.

[15] James M. Montgomery Consulting Engineers, *Tongass Narrows Crossing Preliminary Scoping Study*, prepared by Peratrovich, Nottingham & Drage, Inc., April 15, 1992.

The study concluded that only Corridor 7/7A and the PN&D 72/92 crossing (all bridge alternatives) had merit, and recommended that they undergo future environmental studies and comparison with the existing airport ferry access system.

1.5.4 Environmental Impact Statement, 1994

In 1994, the DOT&PF evaluated the potential environmental impacts of three alternatives for a Tongass Narrows crossing and a No Action Alternative in an EIS.[16] The proposed action was developed to address future limitations on the capacity of the existing ferry service and to provide a more reliable direct link between the City of Ketchikan and the airport on Gravina Island. Scoping for this study evaluated five bridge alternatives, an underwater crossing, and a drawbridge.

The three "action" alternatives selected as reasonable alternatives for evaluation in the EIS were:

> 1—A two-lane bridge from north of downtown Ketchikan on Revillagigedo Island to the north end of the airport on Gravina Island and 1.5 miles of access road ($61,000,000 to construct). This alternative included a horizontal navigational clearance of 500 feet and a vertical navigational clearance of 160 feet.
>
> 2—A two-lane bridge from south of downtown Ketchikan (near the USCG Station) to Pennock Island, a second bridge from Pennock Island to south of Clam Cove on Gravina Island, and 4 miles of access road ($74,000,000 to construct). Navigational clearances for the West Channel bridge were proposed at 500 feet horizontal and 160 feet vertical. The East Channel bridge navigational clearances were proposed at 300 feet horizontal and 60 feet vertical.
>
> 3—Improvements to the existing ferry system ($9,000,000 to $10,000,000), including replacement of the existing ferry vessel with a much larger (120-foot) vessel having capacity for 12 to 15 additional vehicles and 20 to 30 additional passengers, and redesign and replacement of the transfer bridge at the ferry terminal on Gravina Island.

Alternative 1 included a rock breakwater that might have impeded near-shore salmon migrations, but would have been mitigated by a 100-foot opening in the breakwater. The bridge pier supports (rock islands) would cover about 2.8 acres of marine habitat, but it was anticipated that these rock islands would create equally productive habitat for marine species. Alternative 2 would have taken 80 acres of wetlands, and would have the same impacts from rock islands as Alternative 1. Most residents of Pennock Island opposed Alternative 2. Alternative 3 would not have had any new major environmental impacts.

This EIS was a preliminary draft and did not recommend a preferred alternative. The state chose not to pursue the project due to lack of funding.

[16] DOT&PF, *Ketchikan, Alaska, Tongass Narrows Crossing Preliminary Draft Environmental Impact Statement,* prepared by Montgomery Watson, October 1994.